The Intractable Nature of Alignment

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Abstract

IS/business alignment has been a major concern of IT managers for many years but we seem to be little closer to a solution. This paper extends earlier research that developed a theory of alignment that clearly demonstrates that the actions of both business and IT managers are bound by organisational factors. This bounding tends to reinforce the status quo making any changes to the situation extremely problematic. The theory is used to explain the results of other alignment research and to demonstrate the intractable nature of alignment. It is argued that both business and IT managers must be aware of the effect of their current decisions on future decisions and the use of IT to gain competitive advantage.

Keywords

Alignment, dynamics, intractability.

INTRODUCTION

Alignment has been defined as "the degree to which the information technology mission, objectives and plans support and are supported by the business mission, objectives and plans" (Reich & Benbasat 1996, p. 56). Although alignment has been studied for many years we do not seem to be any closer to a solution (Chan 2002). This may be because of the limited view of alignment contained in definitions similar to that above. Definitions such as that by Reich & Benbasat contain a number of implicit assumptions. Firstly, they assume that a set of business strategies exist within a business plan and that these strategies will actually be implemented as planned. Alignment is then a matter of ensuring that an appropriate set of IT strategies that support business strategies and plans are developed and implemented. Once this has been achieved it is assumed that alignment exists. That is, a second assumption is that alignment is an idealised end-state. Similarly, it is assumed that both the business and IT structures can be aligned to assist an end-state of alignment. Although this is the predominant view within the literature there is an increasing belief that alignment is not necessarily an end-state but a dynamic process (Campbell 2007; Chan 2002; Ciborra 1997; Maes et al. 2000).

The business strategy literature now accepts that strategies are rarely implemented as planned (see, for example, Mintzberg 1988). They continually evolve to reflect changes in the environment, organisational policies and understanding. This, then, implies that alignment is a dynamic process that must evolve to cope with these changes. In resolving these, and other, issues of alignment Benbya & McKelvey (2006) provide another definition of alignment. According to them alignment:

> *"… is a continuous coevolutionary process that reconciles top-down 'rational designs' and bottom-up 'emergent processes' of consciously and coherently interrelating all components of the Business/IS relationship at three levels of analysis (strategic, operational and individual) in order to contribute to an organisation's performance over time"* (Benbya & McKelvey 2006, p. 287).

This goes some way to providing a better definition of alignment. It also assumes that alignment research should address both strategy development as well as implementation as recommended by Chan & Huff (1992) and Ciborra (1997).

However the definition of alignment provided by Benbya & McKelvey (2006) still contains a flaw – that the components of Business/IS relationship are consciously and coherently interrelated. It is assumed that both business and IT managers within an organisation are able to understand the complex situation in which they operate and are then free to make the decisions necessary to improve that situation. Alignment research rarely questions the ability of managers to understand the alignment problem or whether they are free to make necessary decisions. It is assumed that managers are free agents with perfect knowledge. Ciborra (1997) in particular questions this assumption and then goes on to argue that alignment research should embrace the complexity of organisational settings rather than attempt to reduce variables and simplify the problem area.

Most prior alignment research has been informed by a positivist epistemology. As such it tends to rank the importance of many variables (for example Luftman & McLean 2004, Luftman 1999) whilst ignoring context and complexity. The preceding paragraphs highlight anomalies in just one area of alignment research – definitions of alignment. There are many other anomalies.

The research reported here used the grounded theory method. The lens used to analyse data embraced complexity. The methodology, choice of participants and anlysis technique is firstly described. Then the grounded theory developed during the study is briefly described as it has been reported elsewhere (Campbell 2007). Finally, the theory is discussed in relation to prior research. It is shown that the theory can explain many of the anomalies and conundrums apparent in earlier alignment research. It also explains why some IT groups are able to collaborate with their business peers whilst others can not. It is argued that the traditional calls for improved communication and business knowledge of IT managers may not be particularly useful. Improving collaboration will be difficult where it is already poor. IT managers are not free agents able to make logical decisions to improve a situation – in this case alignment. The organisational milieu bounds both their understanding and the choices available to them.

RESEARCH METHODOLOGY

The research reported here was part of a doctoral study that used the Glaserian form of grounded theory to understand the nature of IS/Business alignment. Data was collected via unstructured focus groups and semi-structured interviews. These were transcribed and analysed from an interpretive perspective using the interactive coding family. The latter does not assume linear causality but rather "... *mutual effects, reciprocity, mutual trajectory, mutual dependency, interdependence, interaction of effects, covariance. This code is an effort to capture the interacting pattern of two or more variables, when the analyst cannot say which comes first. Nor does it matter, probably*" (Glaser 1978, p. 76).

Initially three unstructured focus groups (Morgan 1998; Stewart & Shamdasani 1990) were held - two consisting of six IT managers each and the third consisting of three business managers. These were used to resolve the conflicting requirements of grounded theory and student research. The grounded theory methodology recommends that the literature is not examined until after data collection and analysis has commenced (Glaser 1992) whilst the requirements of most supervisors is that an extensive literature review is conducted prior to data collection. The use of unstructured focus groups reduced the facilitators influence and transferred power to the participants (Blackburn & Stokes 2000). This ensured that participants discussed issues of importance to them, not what the researcher thought they should discuss. The issues participants raised in these unstructured focus groups were then investigated further in the semi-structured interviews.

Analysis of the focus group transcripts confirmed the research of Chan (2002) who found that strategic alignment is of most concern to practitioners rather than the other forms of alignment identified by Henderson & Venkatraman (1993). It also highlighted the issue of strategy ambiguity in this situation (Campbell 2004). IT managers were then recruited for individual semi-structured interviews (Fontana & Frey 2000). In total sixteen IT and four business managers were interviewed. Some of these were interviewed twice whilst in some instances managers were interviewed individually after having taken part in a focus group.

Sampling of subjects was purposive (Glaser 1998; Morgan 1997) with no attempt being made to ensure that the sample was representative. Participants were recruited from a number of industries and organisations of various sizes from small to medium manufacturing firms, to very large Australian based financial and fast moving goods manufacturers and multi-national organisations. They were also selected to represent various levels of management from a managing director to line managers. Sampling continued until saturation occurred – when no new conceptualisations emerged from the interview data, no new properties of categories emerged and no new relationships between categories were emerging (Dey 1999; Urquhart 2001).

A feature of many grounded theory reports is that, due to the restriction on a priori reading and the insistence on inductive theory development from primary data, the literature is often not introduced until the theory has been at least partially developed. It is then often introduced during the discussion where it is able to "*include, transcend, synthesize and organise*" the extant literature (Glaser 1996, p. xiv).This paper follows that tradition with much of the literature introduced during the discussion.

The goal of a grounded theory study is to develop a theory that explains the actions of participants when faced with a particular problem (Glaser & Strauss 1999). In this instance the problem faced by IT managers was the ambiguity surrounding implemented strategies compared to those contained in plans. The theory that explains IT managers' actions when faced with this ambiguity is shown in Figure 1 and was introduced in Campbell (2007).

A THEORY OF STRATEGIC ALIGNMENT

The theory modeled in Figure 1 demonstrates that the interaction of many of the factors within the Locus of Comprehension and Locus of Control limit the ability of business managers to understand and implement business strategies. As the business strategy literature predicts, strategies being implemented are not necessarily those contained within plans (Baker 1992; Kerr 1995; Mintzberg 1988). This creates strategy ambiguity for IT managers as they are faced with formal business plans that do not correspond with the strategies they can see being implemented. The value and interaction of IS status, Mental models and Shared domain knowledge (and their sub-variables) then limits the type and amount of information made available to IT managers. This impacts their ability to understand, or comprehend, the difference between espoused and enacted strategies (Strategy ambiguity). The Motivation and measurement schemes in use then limit the actions available to them when attempting to achieve alignment.
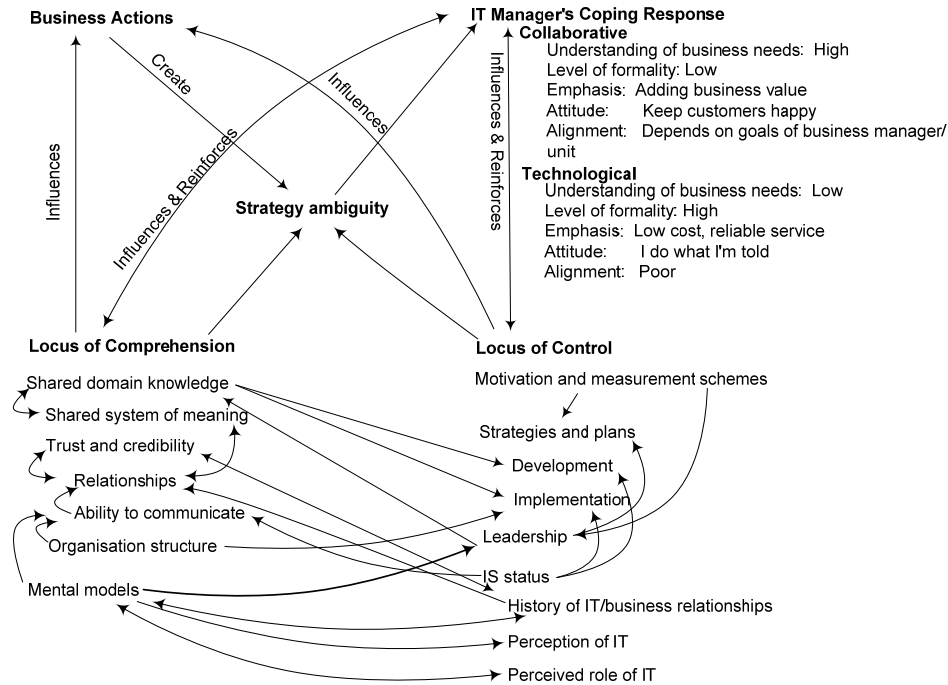

Figure 1: A theory of alignment from Campbell (2007) that explains both the
development of strategy ambiguity and IT managers' response to that ambiguity.

IT managers can attempt to collaborate with their business peers to understand the situation and support the decisions of those business managers. This is known as a collaborative response. As business managers may, or may not, be implementing business strategies as intended, so the actions of their IT peers may or may not support official business strategies. The actions of IT managers tend to support the goals of their business peers or those of the business manager's unit. The attitude of IT managers adopting this response is normally "keep our customers happy."

Alternatively, the interaction of factors within the two loci may make it impossible for IT managers to collaborate with their business peers. In this instance the IT function as a whole tends to retreat from the business and concentrate on the technology, hence the name of the response. Emphasis is placed on providing a low cost, reliable (but basic) IT service. The attitude of IT personnel placed in this situation is normally one of "I do what I'm told" (Campbell 2007).

The actions of IT managers then impacts the variables within the locus of comprehension and locus of control creating a feedback loop that normally reinforces the existing response. Where an IT manager is able to collaborate with a business peer then IS status will improve and the mental model of the business manager is that IT is responsive and that IT can provide competitive advantage. So, they will be more amenable to further communication, and collaboration. Conversely, where IT is seen as a cost, business and IT managers are unlikely to communicate and collaborate. IT managers respond appropriately reinforcing the business managers' mental model that IT is, and should remain, a cost centre.

The model shown in Figure 1 was developed inductively from collected data. It is now discussed in relationship to existing literature. Business managers are identified with an 'M' whilst IT managers are identified with a 'T'. The following numeral identifies individual managers of either type.

DISCUSSION

The choice of response by IT managers, collaborative or technological, is often not voluntary – the value and interaction of variables tends to determine which of the two responses is possible.

The actions of IT managers adopting a particular response then tend to reinforce the values of the variables within the locus of comprehension and locus of control. This creates a feedback loop making a change in response even more difficult. Kogut and Zander (1992) support this interpretation when they state "*Because new ways of cooperating cannot be easily acquired, growth occurs by building on the social relationships that currently exist in a firm*" (P. 383). Relationships are normally poor where a technological coping response is evident with a low level of cooperation. Both the current work and that of Kogut and Zander indicate that cooperation is unlikely to improve as business and IT are most likely to maintain the existing poor relationships. Therefore, management competency in the use of IT to provide competitive advantage is also unlikely to improve. Teece et al. (1997), when investigating the dynamic capabilities of firms, describe this situation as "*At any given point in time, firms must follow a certain trajectory or path of competence development. This path not only defines what choices are open to the firm today, but it also puts bounds around what its internal repertoire is likely to be in the future. Thus, firms, at various points in time, make long-term, quasi-irreversible commitments to certain domains of competence*" (p. 515).

Conceptually the development of dynamic capabilities is similar to co-evolutionary theory. It has been argued that it is not sufficient for IT managers to understand the business (Teo & Ang 1999), but that business managers must also be capable of managing and appropriately employing IT (Earl 1993; Feeny, Edwards & Simpson 1992). The theory shown in Figure 1 exhibits many of the properties of co-evolution such as embeddedness, multidirectional causality, nonlinearity and positive feedback (Lewin & Volberda 1999, pp. 526-527) as well as including many of the factors that limit the development of dynamic capabilities. As such it provides support for the contention of Benbya & McKelvey (2006) that alignment is a co-evolutionary process. It also explains why the dynamic capabilities required to effectively use IT for competitive advantage are not being developed in many organisations. The understanding and actions of business and IT managers are bound by earlier events. Current actions usually reinforce the status quo.

Earlier research has shown the importance of shared domain knowledge and the business competence of IT managers on collaboration between business and IT units. Following this line of investigation Bassellier and Benbasat (2004) developed a taxonomy of required business competence of IT mangers. As a result of empirical research they concluded that the attainment of business competence will lead to an increase in intention of IT managers to collaborate with their business peers. Their hypothesis developed from the literature was based on the premise that "*... self-efficacy (i.e. higher business competence in our study) influences one's favourable outcome expectations and actual technology utilization*" (p. 682). But the current research indicates that the development of relationships and collaboration depends on the self-efficacy of both partners to that relationship. That is, not only must IT managers have business competence but business managers must have some IT competence for a relationship to commence and grow (Feeny, Edwards & Simpson 1992). The business managers within the second focus group argued that many prospective business managers at university did not gain even the rudimentary language necessary to commence dialogue with an IT manager. After graduating they tended to avoid such encounters tending to withdraw to their own "silo". That is, self-efficacy is missing on the part of business managers. Similarly it has been argued that many IT graduates do not have the necessary business jargon to converse with business managers (Tuson 2008). Without the development of meaningful communication and relationships it is unlikely that shared domain knowledge will improve. This, then, limits collaboration.

The above argument indicates that encouraging IT managers to gain business competence to encourage collaboration and, eventually improve alignment, may not be overly helpful. Knowledge of the business (and IT by business managers) is normally gained via relationships. If business managers do not want to form these relationships either because they do not have the necessary language, or because of their mental model, then any amount of encouraging IT managers to improve their business competence and then form relationships and collaborate is likely to be a very long term project. This reflects the experience of those managers identified in this research as working in an organisation where a technological coping response is dominant.

This same argument can be used to question the validity of repeated calls for IT managers to improve communications between themselves and their business peers. Communication requires, at minimum, two actors. If either of them is negative then effective communication is unlikely to occur. This does not mean that communication should not be attempted in this situation. It does indicate that there may be many rebuffs before

the other party reciprocates. It also means that an IT manager should be sensitive to any approach from a business peer if the objective is to improve collaboration.

It can be reasonably safe to state that where a technological response to strategy ambiguity is evident then the management of IT for advantage is not one of the internal competencies that the firm is pursuing regardless of rhetoric. The theory shown in Figure 1 helps to explain why it is so difficult for firms to develop this competence where it is currently lacking.

Whilst analysing the interview with M3 who worked in an organisation where the IT group had been encouraged to adopt a technological coping response the following memo was written:

> If the business perceives IT as a service/cost centre the likely result is:
> * IT managers who do not engage with the business and retreat to a technology focus
> * An IT group separated from the business and subsequently becoming invisible
> * Lack of communications leading to poor relationships between IT and business
> * The creation of a bunker mentality within the IT group.
> If the latter occurs it is going to be extremely difficult to change the situation.

An addendum to this memo was then made:

> If you want to de-motivate staff and get crap service from them, put out the message that they are a cost centre. All of the above will occur. Yes, you need to contain costs in these functions, but you also need to get superior service from them. It's all about leadership, motivation, incentives, measurement and structure.

This was the situation within M3's organisation. It also represents the situation within the organisations of T8, T15 and T16 where a technological coping response was dominant. Later another memo was created whilst analysing the interview with M3:

> This whole section indicates that the view held by senior management of a function will, to a large extent, determine how well that function integrates with the business.

> If, as is the case with the org at which M3 works, IT is seen as a service function and is not perceived to add any value then this will permeate the whole worldviews of both the business and IT units. Measurement and incentives will be based around cutting costs. They will not be invited to decision making meetings. The IT management will react to this and not put forward any ideas on how to improve the business. The IT unit will retreat to a technology base, not communicate with the business and not put any effort into developing relationships.

> When this occurs the IT unit will be seen by all other levels of the business hierarchy as being separate from the business, uncommunicative, unresponsive and difficult to get along with. At this stage it is going to be extremely difficult to turn the situation around.

> Note that M3 is indicating that this situation has occurred with all those units that are seen as supplying a basic service (eg logistics), not just IT.

This, then, helps to explain the results of earlier research. Sabherwal, Hirschheim & Goles (2003) investigated the dynamics of alignment using a punctuated equilibrium model but with mixed results. Their literature review indicated that during evolutionary (that is, stable) periods that there should be a constant high level of alignment. They did not find this. The level of alignment during these periods was stable but it could be either high or low. The model then predicts that during revolutionary periods the level of alignment should change and then be maintained during the following evolutionary period. Sabherwal, Hirschheim & Goles found that in some cases their evidence supported this hypothesis but in other cases it did not. They hypothesized that:

> *… revolutions may be followed by post-revolution adjustments to the strategic IS management profiles, either to reinforce them or to take a step back toward the pre-revolution situation (p. 339).*

The theory shown in Figure 1 may help to explain both anomalies as they relate to strategic alignment. Firstly, depending on the coping response being adopted by IT managers as a result of the influence of variables within the two loci, there could be either high or low levels of strategic alignment during evolutionary periods. The theory indicates that, due to the creation of feedback loops, this situation could be difficult to change - hence the stability. A revolution, or organisational crisis of some kind, may provide the conditions to allow the adoption of

a different response by IT managers. T15 described such a situation that occurred at his previous place of employment (Fin1):

> In Fin1, which merged with [named 3 other banks] in one go. I managed the systems integration of those four banks and it was evident at that time that that was when IT and business really came together ... at that point in time business then got engaged with 'Well what product do I want" What product do I need?' IT sat behind and said 'Well, what systems do I need to move to this. Is it the homegrown system that Fin1 had?' And they went through all these conversations where the relationships started to grow from that. The integration project then delivered the systems and the products that had been spec'd out by that unified group. And that's when things started to get a little more comfortable between business and IT. ...at the same time, or similar time, Fin1 articles of association were changing. It was becoming a takeover target. ...the 10 years since Fin1 became a bank its articles of association said that 95% of the account holders had to agree to any merger. So nobody would take it on. But when that 10 years was up it got back to normal, and so the CEO at the time sat down and said 'We need to have our share price at around $23 to stop any takeovers." And they went through an exercise called Best Bank - 12 month to deliver. Again, 150 top executives in the bank, including business and IT, were all locked in a room, to go through idea generation to say how do we actually improve our share price, reduce our operating costs etc. Our exercise again reinforced the capability of IT to further innovation and change for the business guy. Because you were locked in a room you actually had to work together. The executive got together and agreed on 1,000 ideas that were then clustered together in projects and IT delivered those projects. Share price I think went up to $21 from $8 to $21. ...the legacy of that was that IT and business can work together, and did work together and work well (para. 51).

This quotation indicates that during the period described by T15 the mental models of participants changed. The perception of IT and IT's role within the organisation changed. This, then, allowed the development of communication, trust, relationships, shared system of meaning and shared domain knowledge between business and IT managers. These changes were then maintained into the post-revolutionary period. But this change is not a given. There is no guarantee that the mental models held by managers will change during a crisis. Changing mental models normally requires the questioning of underlying belief systems (Senge 1990, pp. 174-204) and the adoption of double-loop learning (Argyris 2003, p. 70). Argyris (2003) argues that neither of these tasks is readily adopted by managers and that implementing change that requires such is extremely problematic. In the event that the mental models of participants do not change then a return to the pre-existing coping response of IT managers is almost guaranteed. This, then, helps to explain the results observed by Sabherwal, Hirschheim & Goles (2003). It also questions the calls within the literature for a change in management attitude (Henderson & Venkatraman 1993, p. 480). Whilst this is needed the theory developed here indicates that it may not be so easily achieved. Factors within the organisation tend to continually reinforce the existing mental models held by managers.

Grant (1996) argues that whilst the use of coordination, via the imposition of rules and procedures, may be an efficient method of transferring knowledge between individuals within an organisation it is not particularly effective where a problem situation crosses functional boundaries. In the latter situation the encouragement of cooperation is more effective (Grant 1996, p. 119). This seems to reflect the two coping responses. The technological response tends to use rules and procedures to manage IT but there does not appear to be a significant transfer of knowledge between various business functions and IT. As predicted by Grant (1996) these organisations do not appear to be gaining competitive advantage via alignment. Conversely, there does appear to be a reasonable transfer of knowledge between units where collaboration and cooperation is either encouraged or employed.

It should not be assumed that moving to a collaborative coping response will improve an organisation's alignment and performance. As previously discussed, when this response is adopted IT managers align their actions with the goals and strategies of their business peers. Because of other factors within the organisation there is no guarantee that the actions of business managers will support the business goals and strategies as they were conceived. Encouraging collaboration between business and IT managers could have many unintended consequences. Business strategies are often modified, or even ignored, during implementation by business line managers (Campbell 2004). An example of this was supplied by Nordstrom & Soderstrom (2003) who conducted a case study of a Swedish forest industry corporation. Senior management attempted to implement a new vision for the organisation. One strategy selected to enable the new vision was the implementation of a SAP system. However business users subverted the vision to their own need of continuing to work in their traditional ways. In this they recruited the assistance of IT developers. The result was an automation of existing work practices and processes and the failure of the corporate strategy.

The above would indicate that much more emphasis should be placed on achieving business alignment – alignment between business strategy and business infrastructure. In their seminal paper Henderson & Venkatraman (1993) argued that the most popular method of attempting IS/business alignment was to use business strategies operating through business infrastructure to impact IT infrastructure (p. 477). The current research indicates this is the underlying model in use by those participants adopting a collaborative response. However, this research also indicates that it should be viewed with extreme caution due to the unintended consequences.

Figure 1 indicates that decisions and actions by all relevant actors within an organisation will tend to reinforce the dominant coping response. Another phenomenon that reinforces the status quo was uncovered whilst validating the reasonableness of the theory shown in Figure 1. The theory was shown to a number of the subjects of this research and to other IT managers to gain feedback. When describing the two responses a common remark was "I used to work for an organisation like that, but I left." Among others, this comment was made by T1, M3 and an academic colleague. That is, it appears that IT personnel tend to select the type of organisation in which they wish to work. Some people are content working with technology, ignoring the business. Others are happiest when they are able to collaborate with their peers. If a person's mode of operating is not in accordance with the dominant coping response they will tend to leave the organisation. This phenomenon is not unknown in the literature. For example, when discussing the formation of organisation culture Bell (1999) makes the statement:

> "… these members joined the organization because of the confluence of their personal values with those **stated** by the organization and the **perceived** (again, not necessarily intended) organizational hypocrisy drives them out" (p. 4, emphasis added).

More research is required to determine the level of self selection of IT managers to organisations where the culture, working conditions and coping response coincide with their own values.

M3 also gave evidence to indicate the difference between stated and perceived values. He was asked whether the IT group within his current organisation was considered to be a cost centre rather than an area of advantage. He replied:

> Correct. As I said, I think some of their [the IT group's] problems are driven by senior management's view. But from what I can see IT is doing nothing to help that situation (M3, para. 90).

And:

> I suspect that at a senior level they are being driven by '...how much are you spending' rather than… 'What service and service levels are you providing to your customers?' … I do suspect that they're probably not being given the right direction at a very senior management level, and then there's no will within the IT organisation itself to go out and do that for itself (M3, para. 80).

When then asked whether he thought this IT group could change its response, he replied:

> No. I think they've built themselves in such a way that they're almost impervious to a strategy change. They tend to see their role as purely mechanistic. I guess a technical delivery rather than a business value type thing which is more where the strategies tend to happen. I think that is where they're falling down and it's going to take some effort to change (M3, para. 86).

In a later conversation, not recorded, M3 indicated that the rhetoric of senior management within the firm is that the role of IT is to provide competitive advantage. However, the actions of senior management do not support this. IT is seen as a cost centre.

The theory developed in this dissertation clearly indicates that the process of improving strategic alignment is dynamically complex. Even when managers are shown that their understanding of a complex dynamic situation is flawed they are reluctant to change their mental models and adopt other strategies to deal with a problem situation (Moxnes 1998). That is, improving alignment is going to be a long term process that requires all managers to attempt double-loop learning – something we know is difficult (Argyris 2003).

Earl (1993) identified five different approaches to strategic information systems planning. During the current research one participant (T1) who was familiar with Earl's paper made the observation that in most organisations the CIO is not given a choice on which approach to SISP to adopt. The organisational environment will often dictate a particular approach. This was not specifically investigated in this research. However it appears that various approaches to SISP can be associated with either a technological or collaborative response to strategy ambiguity and alignment. It seems that a technological response encourages the use of either a technological or administrative approach to SISP. Conversely, a collaborative response

appears to encourage the use of either a business-led or organisational approach to SISP. The research reported here did not encounter any use of the method-driven approach to SISP however this could be due to: (a) the small sample size within this research and (b) that it was not specifically investigated.

Using the above and the taxonomy of plan integration used by Teo & King (1996) it is hypothesised that:
- A technological response to strategy ambiguity is associated with either no planning or stand-alone planning.
- A collaborative response to strategy ambiguity is associated with either reactive, linked or integrated planning.

Further, contrary to Teo & King (1996) who believe that a higher level of plan integration between the business and IT (that is, either linked or integrated planning) mitigates IT planning problems by facilitating greater communication and understanding between business and IT management (p. 318) it is hypothesized that:

- Collaboration, communication and shared domain knowledge is required between business and IT executives **before** the higher levels of plan integration (linked or integrated planning) are possible.

All of the previous hypotheses need to be confirmed with further research.

One final comment. It would appear that an attitude towards IT similar to that espoused by Carr (2005), that IT is a commodity, will inevitably lead to a technological coping response. This may be appropriate for some businesses in some industries. However, it may not be appropriate if senior management wishes IT to contribute to an advantage over competitors.

CONCLUSION

The alignment literature tends to assume that the dynamics of alignment, where it is even considered, is due to forces external to the organisation most notably market forces (see, for example, Henderson & Venkatraman 1993, p. 473). The current theory indicates that most of the dynamics of alignment can be explained by forces within the organisation. This reflects experience within system dynamics research (Sterman 1994, 2000). Because of the type of data collected here (qualitative) and the type of analysis conducted it is not possible to positively identify sensitive variables within the system - those that will provide the most improvement to the alignment system for the least effort. Nor is it possible to positively identify those variables that may have the greatest impact on alignment regardless of effort. However, it appeared during analysis that those variables with the greatest impact could be the motivation and measurement schemes applied to managers and business units, and the mental models of senior management regarding the role of IT within the organisation. Neither of these variables are given any prominence in the alignment literature, possibly because of difficulties with their definition (see, for example, the debate on the definition of mental models by Doyle & Ford 1997, 1999; Lane 1998) and measurement.

This research embraced complexity and demonstrates that it is the inter-actions between the various enablers and inhibitors to alignment that is of most importance, not the identification of those variables per se. That is, alignment is a complex and dynamic process and should be studied as such. It has been shown that when this is done then many of the anomalies that are a feature of prior alignment research can often be explained.

Finally, most people can identify the dominant response to strategy ambiguity within an organisation by talking for a brief period with a few members of senior management. The theory shown in Figure 1 does not provide a definite way forward for managers attempting to improve alignment. It does, however, provide a basis for discussion between senior IT and business managers. They can then decide on an appropriate role for IT within their organisation and be aware of how the system of inter-related variables within their organisation may either work for, or against, achieving their goal. Achieving alignment should not be the responsibility of IT management alone. In many instances the choices IT managers can make regarding alignment are bound by the inter-action of the variables within the locus of comprehension and locus of control. The actions of both business and IT managers reinforce the status quo so bounding future actions even tighter. This, then, explains the intractable nature of alignment.

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